

12. An optical system having a diffractive optical element as manufactured in accordance with the method recited in Claim 11.

13. An optical system having a diffractive optical element according to Claim 1.

14. An optical system having a diffractive optical element as manufactured in accordance with the method recited in Claim 9.

REMARKS

Claims 1 to 14 now are pending in the subject application. The independent claims are Claims 1 to 4, 7, 8 and 11.

In the Office Action, Claims 1 to 14 were rejected under 35 U.S.C. § 103(a), as unpatentable over U.S. Patent No. 5,847,877 (Imamura) in view of U.S. Patent No. 5,208,700 (Harris). Claims 1 to 14 further were provisionally rejected under the judicially created doctrine of obviousness-type double patenting over either commonly owned, co-pending US Patent Application No. 09/871,630 or US Patent Application No. 09/411,632. Reconsideration and withdrawal of the rejection and provisional rejections respectfully are requested in view of the following remarks.

Initially, Applicants acknowledge the provisional rejections of Claims 1 to 14 under the judicially created doctrine of obviousness-type double patenting. However, Applicants respectfully request that such provisional rejections be held in abeyance, as not yet ripe, until allowable subject matter is identified in the subject application.

The present invention relates to a novel diffractive optical element, and a method of manufacturing same. In one aspect, as variously recited in independent Claims 1 to 4, 7 and 8, Applicants' invention relates to a diffractive optical element which includes (i) a first diffraction grating and an alignment pattern formed on a first substrate, and (ii) a second diffraction grating and an alignment pattern formed on a second substrate. The gratings are accumulated with an air space therebetween, with the alignment pattern formed on the first substrate engaging the alignment pattern formed on the second substrate. As disclose in greater detail in the present application, this novel combination of elements, including *engagable* alignment patterns, provides a significant improvement in precision alignment of a diffraction optical element including first and second substrates having respective opposing diffraction portions with an air gap therebetween.

In a similar aspect, as recited in independent Claim 11, Applicants' invention relates to a method of manufacturing a diffractive optical element. The method includes a step of preparing a mold having (i) an alignment pattern to be engaged with an alignment pattern formed on a substrate having a first diffraction grating pattern, and (ii) a second diffracting grating pattern. The method also includes a step of positioning the first diffraction grating pattern and the second diffraction grating pattern to be spaced with respect to each other, across an air space.

Applicants submit that the prior art fails to anticipate the present invention. Moreover, Applicants submit that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Imamura '877 patent relates to a diffractive optical element, and discloses a diffractive optical element including a first layer having a first diffractive grating and a second layer having a second diffractive grating. However, Applicants submit that the Imamura '877 patent fails to disclose or suggest at least the above-discussed features of the present invention. As acknowledged by the Examiner, the Imamura '877 patent fails to disclose a diffractive optical element including the feature of an air gap between a first layer and a second layer. Rather, the Imamura '877 patent merely discloses a structure including three layers of optical materials, which may be different optical materials (see column 9, lines 43 to 55). Nowhere does the Imamura '877 patent suggest that intermediate or sandwiched "layer" may be *air*. Moreover, nowhere does the Imamura '877 patent disclose or suggest the features of a first substrate having a first diffractive grating *and an alignment pattern* and a second substrate having a second diffractive grating *and an alignment pattern*, where the first and second diffractive gratings are accumulated with an air gap therebetween, *and where the alignment pattern on the first substrate and the alignment pattern on the second substrate are engaged*, as disclosed and claimed in the present application.

The Harris '700 patent relates to a lens cover assembly for binary diffractive optical lenses, and discloses a method of forming a plurality of optic lenses with a corresponding plurality of recesses in the surface of one substrate. However, Applicants submit that the Harris '700 patent fails to disclose or suggest at least the above-discussed features of the present invention. Rather, the Harris '700 patent merely discloses a method of manufacturing a plurality of optic lenses by forming a plurality of recesses in *one* substrate, and bonding a second, flat cover substrate to the first substrate. The Harris '700

patent further teaches that aligning markings can be used to align the binary diffractive lens in the corresponding recess with the lens cover substrate. However, nowhere does the Harris '700 patent disclose or suggest the features of a first substrate having a first diffractive grating and an alignment pattern and a second substrate having a second diffractive grating and an alignment pattern, where the first and second diffractive gratings are accumulated with an air gap therebetween, *and where the alignment pattern on the first substrate and the alignment pattern on the second substrate are engaged*, as disclosed and claimed in the present application. Nor is the Harris '700 patent believed to add anything to the Imamura '877 patent that would make obvious the claimed invention.

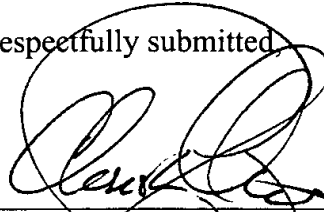
For the foregoing reasons, Applicants submit that independent Claims 1 to 4, 7, 8 and 11 are allowable over the cited art.

The remaining claims in the present application are dependent claims which depend from these independent claims, and thus are patentable over the applied documents for reasons noted above with respect to those independent claims. In addition, each dependent claim recites features of the invention still further distinguishing it from the applied documents. Applicants request favorable and independent consideration thereof.

Applicants believe that the present Response is fully responsive to each of the points raised by the Examiner in the outstanding Official Action, and submit that the application is in condition for allowance. Favorable reconsideration of the claims and passage to issue of the subject application respectfully are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Chris Wrist", is written over a horizontal line.

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